

8 Monitoring and Review

The RMP is required to be reviewed and updated annually, prior to renewing the registration of your cooling tower system or whenever there are major changes to the operations. It should also be reviewed whenever the risks have changed.

The RMP may need modifying because of:

- Changes to the water system or its use.
- Changes to the use of the building in which the water system is installed.
- The availability of new information or technology about risks or control measures.
- The results of checks indicating that control measures are no longer effective.
- A case of Legionnaires' disease possibly associated with the system.
- Unusual factors, for example demolition or construction of buildings on or near the site or road works or other construction activities generating dust⁵.
- Special events that will bring large numbers of people onto or near the site⁶.
- A change in the number, or level of vulnerability, of people who may be exposed to aerosols from the cooling tower system. For example, construction of an apartment building near an existing cooling tower would introduce significant numbers of new residents into a risk assessment.

If *Legionella* is isolated in a cooling tower system, consider re-evaluating the adequacy of the maintenance program. Good quality record-keeping—as required by Victorian law—will assist such a review by allowing trends to be monitored. If your site or organisation has multiple cooling tower

systems and *Legionella* has been detected in one system, you should strongly consider reviewing the maintenance program and risks associated with **all** of your systems. This may identify any common problems. In more high risk or complex sites, or where large workforces are involved, it is also recommended that you engage an independent consultant to conduct this review.

It is important that a single person with sufficient authority to initiate action and commit funds has responsibility and accountability for the operation of the cooling tower system. It will assist with the overall management of the cooling tower system if that person has been trained in the management of risks associated with cooling tower systems.

Regular reporting to senior management is an important aspect of risk management, particularly in larger organisations. It is important that those with the power and authority to allocate funding for capital or ongoing improvements have access to sufficient information on which to base their decision making.

⁵ In such circumstances, options for addressing the increased risk of contamination of the water are to (a) increase the cleaning frequency, (b) increase the rate at which the biocide is added, (c) install a side stream filter, or (d) a combination of these.

⁶ Special events may warrant increased maintenance to address the increased risk associated with large numbers of people coming to or near a site.

9 Communication

You need to be clear on what to do, who to notify and how it will be done, in the case of an adverse event.

9.1 Adverse Events

An adverse event in this context includes:

- A HCC level of greater than 100,000 CFU/mL
- Detecting *Legionella* at any concentration
- Being advised of a case of Legionnaires' disease possibly associated with your cooling tower system.

It is strongly recommended that every organisation with a cooling tower system develops and maintains an action plan to deal with the adverse events described above. A communication plan needs to contain responses to events of varying seriousness.

9.1.1 Significance of High HCC Levels

HCC test results as stated earlier in Section 7.2.3.1 indicates to those responsible for the system the extent of control over the system and in particular, the water chemistry. There is no direct correlation between HCC levels and *Legionella* concentration. For example, it is possible to have very low HCC levels and still detect *Legionella*. Equally, it is possible to have very high HCC levels, but not detect *Legionella*. However, a high HCC level (which is regarded as any count of greater than 100,000 CFU/mL) is an indicator that the system is moving out of control and that the system may support *Legionella* growth unless action is taken to bring the system back under control. The Health (*Legionella*)

Regulations 2001 specify the action that must be taken for HCC levels above 100,000 CFU/mL.

HCC levels are not directly related to Legionnaires' disease and so are not regarded by the Department of Human Services as of the same public health significance as the detection of the disease-causing *Legionella* bacteria.

9.1.2 Significance of *Legionella* Detection

Detecting *Legionella* in the recirculating water of a cooling tower system has public health implications. Consequently, the Health (*Legionella*) Regulations 2001 require a response within 24 hours, including the disinfection of the system and re-sampling and testing for *Legionella* two to four days later.

9.1.3 Legionnaires' Disease

Being advised by the Department that a case of Legionnaires' disease is possibly associated with your site must trigger a range of responses, including following the advice of the Department in relation to the treatment of the cooling tower systems on-site.

9.2 Developing an Action Plan

A communication plan should consider the responses to each of the above scenarios and describe in detail who will be informed of the issue, how they will be informed and what the message will be.

9 Communication

In deciding who you would advise in the event of an adverse result, consider:

- **Due diligence.**

This is a legal principle that says to minimise the potential for another party to take legal action against you for failing to properly exercise a duty of care to that person, you should be able to demonstrate that you took all reasonable precautions to stop that event occurring and to minimise the potential impact of damage relating to that event.

In relation to cooling tower systems, this can be demonstrated by a clearly documented process that reviewed the risks associated with the cooling tower system and developed an action plan that was carried out efficiently.

However, where a cooling tower system has been tested and *Legionella* detected, you need to consider the potential impact of the system causing Legionnaires' disease.

- **Minimising the adverse impact on your business.**

Experience with major outbreaks of Legionnaires' disease has shown that the linking of cases of the disease with particular premises can have a major impact on the business concerned. Immediate and appropriate action is essential, combined with adequate disclosure at appropriate times. Enabling people who have been exposed to *Legionella* to minimise the impact of the disease through early diagnosis and treatment could all help limit the impact to your business.

This approach has to be carefully balanced with a need not cause undue anxiety among those involved.

- **Minimising the adverse health impacts to potentially exposed people.**

The potential for serious health effects from Legionnaires' disease need to be considered when deciding whom to notify in the event that *Legionella* is detected. Considerations could include whether the tower system is located in or close to an acute health or aged residential care facility, or if other susceptible groups have been exposed to aerosols from the system. This could influence your decision on who and how to notify at an early stage. Such a notification would allow those potentially exposed to monitor their health and seek medical advice if they show symptoms.

- **The role of workplace health surveillance.**

Workplace surveillance to identify staff absent due to ill health (particularly with flu-like symptoms) immediately after *Legionella* has been detected in a cooling tower system can form part of a communication plan. Once identified, the worker concerned may be contacted and in some cases advised to bring the matter to the attention of their medical practitioner. Workplace surveillance may be recommended by the Department under some circumstances, such as the possible linking of the site with a case of Legionnaires' disease.

9.2.1 Post-Sampling Treatment

Many organisations that have had a positive *Legionella* test in a cooling tower system have been reluctant to notify their stakeholders of the result. This is generally because they are unsure of the potential reaction.

For this reason, where *Legionella* testing is routinely used, you may wish to consider adopting a standard preventative disinfection procedure. Immediately after the sample is taken, manually disinfect the system by 'slug dosing' with an additional amount of biocide (or an alternative biocide). This is a conservative practice, but deals with the ten-day time lag between testing and results and the implications of obtaining a positive result.

What would your response be if you took a sample and then ten days later you are informed that is positive for *Legionella*? Your workforce or others may be alarmed and want to know what action you have taken and will take.

If you have not manually dosed the system immediately after the sample was taken, you can at best respond by saying that you have followed best practice before the testing and since you were advised. However, if after taking the sample you had manually disinfected the system, you can advise staff and others of that fact and that you are following the Health (*Legionella*) Regulations by disinfecting the system, reviewing cooling tower related programs and correcting any faults and retesting between two and four days later. In this way, the information can be accompanied by details of the preventative action already taken to disinfect the system, as well as action being taken after the positive test.

9.2.2 Who to Inform If *Legionella* Is Detected

Employers have a legal obligation under the *Occupational Health and Safety Act 1985* to fully inform the elected health and safety representatives at the workplace about all health and safety aspects of the working environment. **The detection of *Legionella* in a cooling tower system should be notified to elected health and safety representatives.**

Similarly, the information must be communicated to those with some responsibility for the cooling tower system, including the water treatment provider.

Other people you should also consider notifying are:

- Staff who may be affected by the cooling tower.
- Your medical officers and occupational health officers.
- Relevant unions.
- Other relevant service contractors.

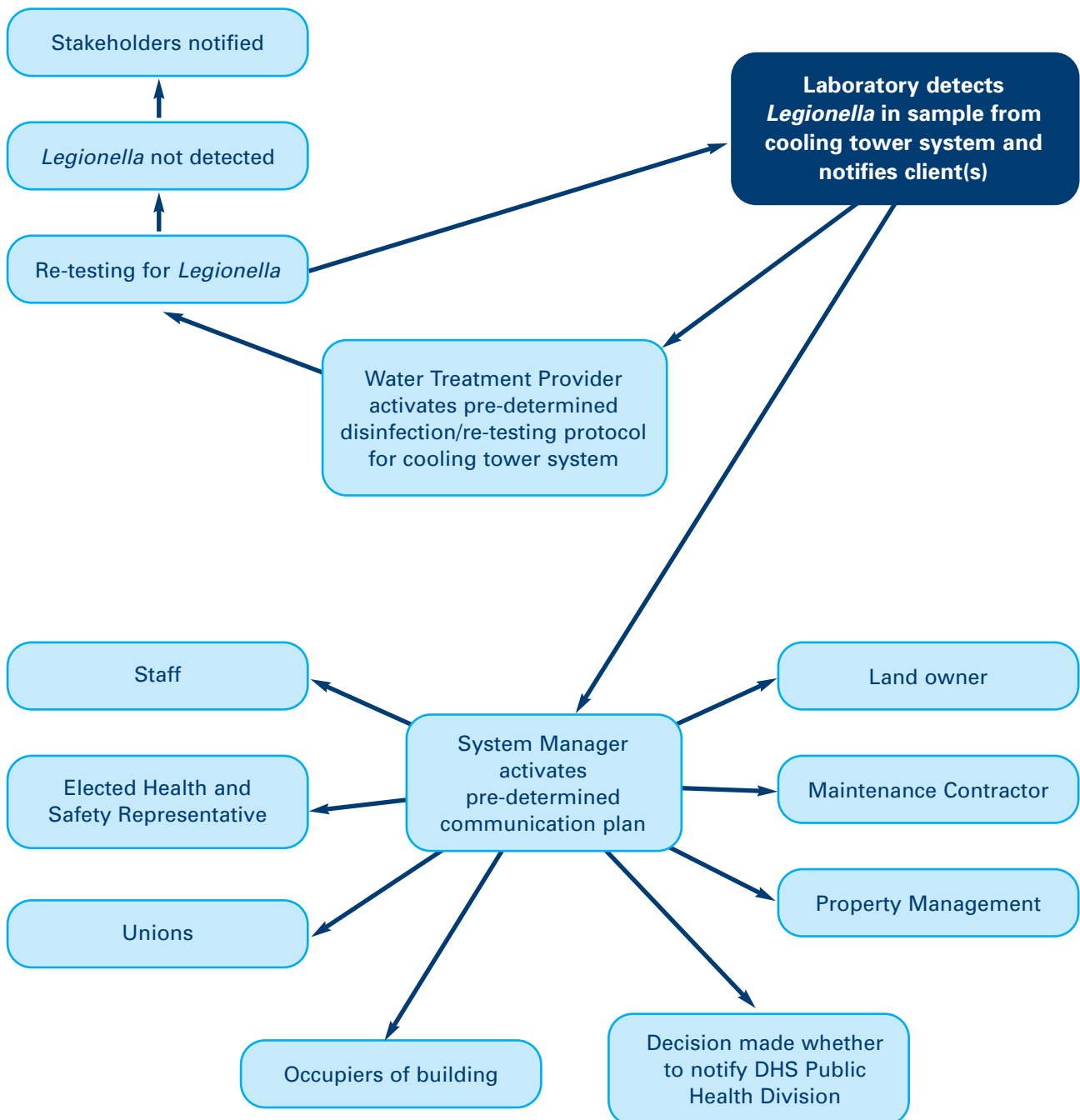
- Other occupiers of the building.
- Site owners.
- Your employee assistance program (where it exists) to brief them on the issues so they can deal with enquiries from concerned staff if they need counselling.
- The Department of Human Services Public Health Division⁷.
- Your local Council Environmental Health Officer.
- Your media liaison staff (where they exist).
- Your company's public spokesperson.
- Your customers.
- Neighbours to the site who may have been exposed to the aerosols from the system.

You need to consider your policy on how and what you will communicate about the problem and the action that you are taking. Figure 16 is a flow chart that summarises the flow of information in such a situation. It is not uncommon in industry to have complex management relationships in place on a site. For example, in a Melbourne CBD office tower, the site may be owned by one company that has outsourced property management. The property manager usually then outsources property maintenance. The property maintenance company outsources mechanical services maintenance and the mechanical services contractor outsources cooling tower system water treatment. Communication in such a complex web of corporate structures is crucial and should be defined in a communication plan and in contracts between the parties.

⁷ This is a mandatory action under the circumstances described in Section 9.2.

9 Communication

Figure 16 Recommended Legionella Detection Communication Plan



The Department provides explanatory information for you to use in helping those notified understand the issues. Such an education program should ideally occur before the adverse event. It should include basic information about where the cooling tower systems exist, what is done to manage the risks of Legionnaires' disease and what procedures are in place to deal with the detection of *Legionella*.

Action plans will vary from site to site but a model procedure for cooling tower systems detected with *Legionella* is Attachment 5.

9.2.3 Who to Inform if High HCC Levels are Detected

Some organisations are opting to take a totally transparent approach and inform all stakeholders of all bacterial test results. However, the Department considers **as a minimum** that a high HCC result (greater than 100,000 CFU/mL) should be communicated to:

- Those who are responsible for the cooling tower system.
- The Occupational Health and Safety Committee. This could be in the form of a report to the next scheduled meeting of the Committee, describing the result and what action has been taken to address the issue, including water treatment and re-testing.

9.3 Developing a Communication Plan

It is strongly recommended that the development of communication plans be done in an open and participative manner that involves key stakeholders and particularly staff. This can best be done using existing structures such as an Occupational Health and Safety Committee.

9.4 Notification to the Department of Human Services

As stated earlier, the Health (*Legionella*) Regulations 2001 require that if *Legionella* is detected in three consecutive water samples taken from the same system, the responsible person (who owns, manages or controls the cooling tower system) must notify the Department of the detection of the bacteria immediately by telephone, followed by a written notification within three days of the third detection of the organism.

However, wherever consecutive adverse results such as high HCC levels or the detection of *Legionella* are obtained it is suggested that an independent review of the RMP be made to attempt to identify any weaknesses in the system which can be further addressed to improve the system and reduce the overall level of risks.

10 The Auditing Process

The Building Act requires that your RMP be independently audited by an approved auditor. This is the so-called 'statutory audit'. It should not be confused with a review of an RMP, which may be conducted at any time by a competent person.

10.1 Why Do I Need an Audit?

The purpose of the audit is to confirm that the RMP addresses the critical risks prescribed in the Building (*Legionella* Risk Management) Regulations:

- Stagnant water
- Nutrient growth
- Poor water quality
- Deficiencies in the cooling tower system
- Location and access.

Further, it demonstrates that the RMP is being implemented.

10.2 When and How Often Is the Audit Required?

The first audit will be required within three months of the date for renewal of registration in the registration year following the development of the RMP. The plan will then have to be audited on an annual basis thereafter in the three months before the registration is due to expire.

During 2001 relatively few cooling tower systems will require statutory audits. Only those cooling tower systems commissioned between 1 March 2001 and 31 December 2001 will require a statutory audit during 2002. Most cooling tower systems in Victoria will not require an audit until mid-2003.

10.3 Where Can I Find an Approved Auditor?

The Department of Human Services will be responsible for the approval of auditors. A process for this will be developed during 2001 for those few cooling tower systems that require audits during 2002. The Department will contact those land owners requiring audits during 2002, to provide them with a list of approved auditors.

From 2003 onwards, you will be able to obtain a list of approved auditors by accessing the Web site at www.legionella.vic.gov.au or by ringing 1800 248 898.

The auditor will be required to satisfy themselves that the RMP meets the requirements of the Building (*Legionella*) Act 2000, the Building (*Legionella* Risk Management) Regulations 2001 and the Health (*Legionella*) Regulations 2001. The auditor must be satisfied that the risk factors have been considered and addressed as required, based on your risk analysis. They will also need to view the maintenance logbooks and any other documents referred to in the plan to satisfy themselves that what was committed to be done in the RMP has in fact been done. For example, where the plan identifies a work program to install a drift eliminator by a particular date, then they will need to see proof that it has been installed, such as a statement from the supplier.

10.4 Does the Auditor Need to Visit the Site?

The audit is essentially a paper audit and may be undertaken by forwarding copies of all relevant documents to the auditor for them to do an off-site audit. This may be particularly suitable in more remote areas where the travel time and costs of attendance on-site would be significant. It is important to note though that the original documents must remain on-site at all times.

10.5 What if the Auditor Does Not Approve the RMP?

If the auditor believes that you have not met the requirements of the legislation, they must notify the Department of Human Services Environmental Health Unit, who will investigate the report.

10.6 What Records Do I Need to Maintain for the Audit?

In addition to the RMP, the auditor will also need to inspect maintenance records.

The Health (*Legionella*) Regulations 2001 require the responsible person to keep a maintenance log of the cooling tower system that records details of:

- All maintenance activities undertaken in relation to the system.
- All microbiological test results of samples taken from the system.
- Any approval issued by the Secretary of the Department of Human Services to use a different method of maintenance and testing.

Glossary

Acute health or aged residential care facility A place where acute health care is provided, such as a hospital, or aged residential care facilities, such as nursing homes or hostels.

Automated dosing device A device that automatically discharges a measured amount of chemical to the water inside a cooling tower system.

BCC Building Control Commission.

Biocide A physical or chemical agent capable of killing microorganisms, including *Legionella* bacteria.

Biodispersant A chemical compound added to the water inside a cooling tower system, to penetrate and break down any biofilm that may be present on the wetted surfaces of the cooling tower system.

Biofilm A surface layer of microorganisms. It is usually combined with particulate matter, scale and products of corrosion.

CFU/mL Colony Forming Units per millilitre of sample. Refers to bacterial levels detected in a sample.

Clean To render free from visible sludge, foam, slime (including algae and fungi), rust, scale, dirt, and any deposit of impurities or other foreign material.

Cleaning Maintenance work including disinfection, draining, dispersion and removal of solids, manual scrubbing and flushing.

Cooling tower A device for lowering:

- (a) the temperature of recirculated water by bringing the water into contact with fan forced or fan induced atmospheric air; or
- (b) the temperature of water, a refrigerant or other fluid in a pipe or other container, by bringing recirculated water and fan forced or fan induced atmospheric air into contact with the pipe or container.

An evaporative air cooler or evaporative air conditioner is not a cooling tower.

Cooling tower fill The structure located at the top of a cooling tower designed to create an extensive wetted surface area through which air passes.

Cooling tower system is:

- (a) a cooling tower or number of interconnected cooling towers that use the same recirculating water; and
- (b) any machinery that is used to operate the tower or towers; and
- (c) any associated tanks, pipes, valves, pumps or controls.

Decontamination A process used when a cooling tower system is suspected or implicated as a source of infection of Legionnaires' disease. The decontamination process is usually determined in consultation with the Department of Human Services Environmental Health Unit. It involves a series of actions to disinfect, clean and re-disinfect the cooling tower system. The process is described in detail in Attachment 8.

Disinfect To carry out a process:

- (a) intended to kill or remove pathogenic microorganisms, including *Legionella*; and
- (b) in the case of a cooling tower system, consists of dosing the water of a system with either:
 - (i) a chlorine-based compound, equivalent to at least 10 mg/L of free chlorine for at least one hour, while maintaining the pH of the water between 7.0 and 7.6; or
 - (ii) a bromine-based compound, equivalent to at least 20 mg/L of free bromine for at least one hour, while maintaining the pH of the water between 7.0 and 8.5.

Heterotrophic Colony Count or **HCC** An estimate of the number of viable units of bacteria per millilitre of water made using the pour plate, spread plate or membrane filter test. Also known as total bacteria count, total plate count or viable bacteria count test.

Operational program A documented program detailing the water treatment and physical maintenance of the cooling tower system including details of the service frequency.

Owner of any land Owner in relation to the land or Crown land within the meaning of the Building Act 1993.

PIC Plumbing Industry Commission.

Responsible person The person who owns, manages or controls the cooling tower system.

Service frequency The frequency with which the cooling tower system is thoroughly checked by a competent person. Includes a check of the water quality as well as physical components.

Slug dosing The process of adding in a single dose a much higher amount of chemical biocide than is normally applied, with the intention of rapidly raising the concentration of biocide in the water to a level expected to kill most if not all organisms in the water.